

FORM PTO-1390 (Modified) (REV 11-2000)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE		ATTORNEY'S DOCKET NUMBER 112740-530	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371				U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR) 10/070852	
INTERNATIONAL APPLICATION NO. PCT/DE00/01168		INTERNATIONAL FILING DATE April 19, 2000		PRIORITY DATE CLAIMED September 8, 1999	
TITLE OF INVENTION METHOD AND APPARATUS FOR INPUTTING ALPHANUMERIC CHARACTERS					
APPLICANT(S) FOR DO/EO/US Stockhusen, Dirk					
Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.					
<ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below. 4. <input checked="" type="checkbox"/> The US has been elected by the expiration of 19 months from the priority date (Article 31). 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371 (c) (2)) <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is attached hereto (required only if not communicated by the International Bureau). b. <input checked="" type="checkbox"/> has been communicated by the International Bureau c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US) 6. <input checked="" type="checkbox"/> An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is attached hereto. b. <input type="checkbox"/> has been previously submitted under 35 U.S.C. 154(d)(4). 7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3)) <ol style="list-style-type: none"> a. <input type="checkbox"/> are attached hereto (required only if not communicated by the International Bureau). b. <input type="checkbox"/> have been communicated by the International Bureau. c. <input type="checkbox"/> have not been made, however, the time limit for making such amendments has NOT expired. d. <input checked="" type="checkbox"/> have not been made and will not be made. 8. <input type="checkbox"/> An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)) 9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)). 10. <input checked="" type="checkbox"/> An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)). 11. <input checked="" type="checkbox"/> A copy of the International Preliminary Examination Report (PCT/IPEA/409). 12. <input checked="" type="checkbox"/> A copy of the International Search Report (PCT/ISA/210) 					
Items 13 to 20 below concern document(s) or information included:					
<ol style="list-style-type: none"> 13. <input checked="" type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 14. <input type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 15. <input checked="" type="checkbox"/> A FIRST preliminary amendment. 16. <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment 17. <input type="checkbox"/> A substitute specification. 18. <input type="checkbox"/> A change of power of attorney and/or address letter. 19. <input type="checkbox"/> A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825. 20. <input type="checkbox"/> A second copy of the published international application under 35 U.S.C. 154(d)(4). 21. <input type="checkbox"/> A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4) 22. <input checked="" type="checkbox"/> Certificate of Mailing by Express Mail 23. <input checked="" type="checkbox"/> Other items or information: 					
Return Receipt Requested.					

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR 1.53) <div style="font-size: 24pt; font-weight: bold;">10/070852</div>		INTERNATIONAL APPLICATION NO. <div style="font-weight: bold;">PCT/DE00/01168</div>		ATTORNEY'S DOCKET NUMBER <div style="font-weight: bold;">112740-530</div>	
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24. The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) : <div style="display: flex; justify-content: space-between;"> <div style="width: 80%;"> <input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO <input checked="" type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) <input type="checkbox"/> International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) </div> <div style="width: 15%; text-align: right;"> <div style="font-weight: bold;">\$1040.00</div> <div style="font-weight: bold;">\$890.00</div> <div style="font-weight: bold;">\$740.00</div> <div style="font-weight: bold;">\$710.00</div> <div style="font-weight: bold;">\$100.00</div> </div> </div> <div style="text-align: right; margin-top: 10px;"> ENTER APPROPRIATE BASIC FEE AMOUNT = <div style="font-weight: bold;">\$890.00</div> </div>				CALCULATIONS PTO USE ONLY	
Surcharge of \$130.00 for furnishing the oath or declaration later than months from the earliest claimed priority date (37 CFR 1.492 (e)) <div style="display: flex; justify-content: flex-end; gap: 20px;"> <input type="checkbox"/> 20 <input type="checkbox"/> 30 </div>				<div style="font-weight: bold;">\$0.00</div>	
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	8 - 20 =	0	x \$18.00	\$0.00	
Independent claims	2 - 3 =	0	x \$84.00	\$0.00	
Multiple Dependent Claims (check if applicable).				\$0.00	
TOTAL OF ABOVE CALCULATIONS =				\$890.00	
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2.				\$0.00	
SUBTOTAL =				\$890.00	
Processing fee of \$130.00 for furnishing the English translation later than months from the earliest claimed priority date (37 CFR 1.492 (f)) <div style="display: flex; justify-content: flex-end; gap: 20px;"> <input type="checkbox"/> 20 <input type="checkbox"/> 30 </div>				\$0.00	
TOTAL NATIONAL FEE =				\$890.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)) The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) (check if applicable). <div style="text-align: right;"> <input type="checkbox"/> </div>				\$0.00	
TOTAL FEES ENCLOSED =				\$890.00	
				Amount to be refunded	\$
				charged	\$

a. ☒ A check in the amount of \$890.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees
A duplicate copy of this sheet is enclosed

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 02-1818 A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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P.O. Box 1135
Chicago, IL 60690-1135
Tel: 312/807-4292
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SIGNATURE _____

William E. Vaughan

NAME _____

39,056

REGISTRATION NUMBER _____

March 8, 2002

DATE _____

BOX PCT

IN THE UNITED STATES ELECTED/DESIGNATED OFFICE
OF THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY-CHAPTER II

5

PRELIMINARY AMENDMENT

APPLICANT: Dirk Stockhusen DOCKET NO.: 112740-530
SERIAL NO: GRÖUP ART UNIT:
FILED: EXAMINER:
INTERNATIONAL APPLICATION NO:: PCT/DE00/01168
INTERNATIONAL FILING DATE 19 April 2000
INVENTION: METHOD AND APPARATUS FOR INPUTTING
ALPHANUMERIC CHARACTERS

Assistant Commissioner for Patents,
Washington, D.C. 20231

Sir:

10 Please amend the above-identified International Application before entry into
the National stage before the U.S. Patent and Trademark Office under 35 U.S.C. §371
as follows:

In the Specification:

Please replace the Specification of the present application, including the
Abstract, with the following Substitute Specification:

SPECIFICATION

TITLE OF THE INVENTION

METHOD AND APPARATUS FOR INPUTTING ALPHANUMERIC CHARACTERS

BACKGROUND OF THE INVENTION

The present invention relates to a method and an apparatus for inputting alphanumeric characters, where the keys used for input have multiple associations; i.e., with a multiplicity of characters.

10 The rapid spread of mobile radio telephones has just recently been accompanied by the similarly rapid development of mobile data transmission; in particular, in the form of "short messages" transmitted using a "Short Message Service" (SMS). In this context, text information is input into mobile radio telephones usually using a keypad device which contains twelve keys, where the individual keys
15 for inputting the letters, digits and special characters have multiple associations. Depending on the character which is to be input, the key associated with this character needs to be pressed in accordance with a number of keystrokes which is required for inputting this character and has a fixed association with the character. Thus, by way of example, the key labeled "2" needs to be pressed once to input the letter "A", needs to
20 be pressed twice to input the letter "B", needs to be pressed three times to input the letter "C" and needs to be pressed four times to input the digit "2". This has the advantage that a practiced user can input texts quickly. A drawback of such an implementation, however, is that the maximum number of keystrokes is generally required in order to input strings of digits, such as telephone numbers. Thus, inputting
25 the number "222" generally requires that the key labeled with the digit "2" be pressed twelve times.

The present invention is, therefore, directed toward methods and apparatuses which allow alphanumeric characters to be input intuitively and with little effort using keys which have multiple associations.

SUMMARY OF THE INVENTION

The present invention achieves this object by means of the features of the independent patent claims. Advantageous and expedient developments can be found in the dependent claims.

5 The invention is thus based on the concept of the input of strings of characters involving the association between inputtable characters and the number of keystrokes required for inputting a character being matched to the user's behavior on the basis of characters which have already been input.

10 The matching can be done, by way of example, such that the keystrokes required for inputting a string of characters is reduced as compared with a fixed association between inputtable characters and the appropriate number of keystrokes required for inputting these characters.

15 Particularly when the matching to the user's behavior is structured such that, in automatic response to the input of a first digit, the input of a second digit requires that the key associated with the second digit be pressed only once, the input of a string of digits, for example a telephone number, requires a much smaller number of total keystrokes than would be the case if there were a fixed association between characters and the number of keystrokes required therefor in each case.

20 In the context of the present invention, key is understood to refer to any type of operating elements, which also may be produced by a membrane keypad or a touch screen.

Additional features and advantages of the present invention are described in, and will be apparent from, the following Detailed Description of the Invention and the Figures.

25 BRIEF DESCRIPTION OF THE FIGURES

Figure 1 shows a schematic illustration of one embodiment of the inventive apparatus.

Figure 2 is a sketch which shows a control device in various stages in an embodiment of the inventive method.

30 DETAILED DESCRIPTION OF THE INVENTION

Figure 1 shows a control device MMI including a display device, such as a graphical display DPL, and a keypad device TAS having various keys tas. In this

case, the keys `tas` have multiple associations for inputting a number of characters.

Thus, by way of example, the key labeled “2” has the associated characters “2”, “A”, “B” and “C”. It is, thus, possible to use this key to input both a digit zif and letters bs.

One embodiment of the present invention provides for at least one key also to have an associated symbol sym, as is shown by the key labeled “3”.

To control this control device MMI, a processor device PE, such as a microcontroller, is provided which includes a processor CPU, a memory device SPE and an input/output interface which can be used to produce the connection to the control device MMI. The elements of the processor device are connected to one another via a bus system BUS.

In this case, the processor device can be part of an electronic appliance, such as a mobile telephone, and can also control other methods and applications specific to mobile telephones.

The memory device SPE, which also can be a volatile or nonvolatile memory chip, stores information relating to the association between characters which can be input using a key and the corresponding number and of keystrokes which is required for inputting these characters. Depending on the embodiment, the memory device SPE or parts of the memory device SPE can be produced as part of the processor device (shown in Figure 1) or can be produced as an external memory device (not shown in Figure 1) which is located outside the processor device PE or even outside the appliance containing the processor device PE and is connected to the processor device PE via lines or a bus system.

Figure 1 shows the association between inputtable characters *zei* and the number of keystrokes respectively required therefor in the memory device SPE, using the key *tas* labeled “2”. Thus, by way of example, when starting to input a message or after a letter has been input, or in response to the input of a letter, one keystroke is required in order to input the letter “A”, two keystrokes are required in order to input the letter “B”, three keystrokes are required in order to input the letter “C” and four keystrokes are required in order to input the digit “2”.

After a digit has been input, or in response to the input of a digit, the association between characters which can be input using the keys and the number of keystrokes required for inputting these characters is matched to the user's behavior,

and hence different numbers anz' are assigned to the inputtable characters zei .

Accordingly, the input of a further digit requires only one keystroke on the key associated with this digit. In the example shown here, the input of a “2” requires only one keystroke, whereas the input of a letter “A” to “C” now requires one respective keystroke more as compared with the original number anz. Appropriate matching of the association between characters *zei* and the number of keystrokes required for inputting them is also carried out automatically for the other keys, so that, by way of example, the input of a “3” after a “2” has been input also requires only one keystroke.

5 keystroke more as compared with the original number anz. Appropriate matching of the association between characters *zei* and the number of keystrokes required for inputting them is also carried out automatically for the other keys, so that, by way of example, the input of a “3” after a “2” has been input also requires only one keystroke.

Depending on the embodiment, a space character can indicate the end of a
10 string of digits and the start of a string of letters or the continuation of a started string
of digits or a started string of letters.

10 string of digits and the start of a string of letters or the continuation of a started string
of digits or a started string of letters.

One embodiment of the present invention provides for a key tas to have an associated symbol sym as well as associated letters and an associated digit zif. When a string of symbols is input, the association between characters which can be input using a key and the number of keystrokes required for inputting these characters is adjusted in line with the matching described above for the input of a string of digits.

15 using a key and the number of keystrokes required for inputting these characters is
adjusted in line with the matching described above for the input of a string of digits.

Figure 2 shows a control device and, below that, a sketch of the associated memory use in two different input modes; once after a letter has been input MMI and once after a digit has been input MMI'.

20 In this case, the keypad device corresponds to the keypad device TAS described in Figure 1. The lower region of the display DPL contains a preselection window VF which shows the characters which can be input using a key in an order which reflects the number of keystrokes which is required for inputting the individual characters.

25 A provision in another embodiment of the present invention is that, although the characters in this preselection window are shown in a fixed order, a marker (cursor) automatically marks the character whose input requires only one keystroke.

In a further embodiment of the present invention, the currently selected character, which is deemed to have been input after a certain time period has elapsed, is in first position in this case. The upper region of the display DPL shows the characters which have been input so far, and a second preselection window VF shows the character which is currently to be input in highlight. In this case, the upper

30 is in first position in this case. The upper region of the display DPL shows the characters which have been input so far, and a second preselection window VF shows the character which is currently to be input in highlight. In this case, the upper

preselection window contains the character which is in first position in the lower preselection window.

5 The memory use shown partially for the keys labeled "2" and "3" shows the known association between characters *zei* which can be input using a key and the number *anz* of keystrokes respectively required therefor.

10 The second illustration of the control device MMI' shows the display DPL after a digit has been input. This illustration's preselection window VF, which appears after the key labeled "3", for example, has been pressed once, shows the characters which can be input using this key and are again arranged in an order which reflects the number of keystrokes which is required for inputting the individual characters. It can be seen that, in response to the input of a digit "4", the association between characters which can be input using this key and the number of keystrokes required therefor has been matched to the user's behavior such that the first position now contains the digit "3", wherein only one keystroke is required in order to input this digit "3".

15 The memory use shown partially for the keys labeled "2" and "3" shows the association, automatically matched to the user's behavior, between characters *zei* which can be input using a key and the number *anz* of keystrokes respectively required therefor after a digit has been input.

20 Depending on the particular embodiment of the present invention, the order of the characters can, for the purposes of matching to the user's behavior, be produced cyclically or in line with statistical examinations relating to the probability of occurrence of a specific string of characters.

25 In addition, one embodiment of the present invention provides for the input mode change, effected by inputting a digit or a letter, or the current input mode to be displayed using a visual signal, such as an appropriate symbol on the display DPL.

Although the present invention has been described with reference to specific embodiments, those of skill in the art will recognize that changes may be made thereto without departing from the spirit and scope of the invention as set forth in the hereafter appended claims.

ABSTRACT OF THE DISCLOSURE

A method and apparatus for inputting alphanumeric characters using keys which have multiple associations, wherein when a string of characters is input, the association between inputtable characters and the number of keystrokes required for
5 inputting these characters is automatically matched to the user's behavior.

In the Claims:

On page 8, cancel line 1 and substitute the following left-hand justified heading therefor:

CLAIMS

5 Please cancel Claims 1-8, without prejudice, and substitute the following
claims therefor:

9. A method for inputting alphanumeric characters, the method comprising the steps of:

defining at least one key to have an associated plurality of characters including
10 at least one digit and at least one letter, with one of the plurality of characters able to
be input using a particular number of keystrokes which are associated with the one
character;

15 automatically matching, when a string of characters is input, an association, used for inputting a further character, between inputtable characters and a number of keystrokes required for inputting the characters, to a user's behavior in response to a character which has been input;

structuring the matching to the user's behavior such that the number of keystrokes is reduced as compared with a fixed association between inputtable characters and the number of keystrokes required for inputting the characters;

20 selecting a character to be input using at least one selection window; and
 showing, via the preselection window, the characters which can be input using
 a key in an order which corresponds to a current association between characters and
 the number of keystrokes which are required for inputting the characters, with a
 currently selected character being shown in highlight.

25

10. A method for inputting alphanumeric characters as claimed in Claim 9, wherein, in response to the input of a first digit, the input of a second digit requires that a key associated with the second digit be pressed only once.

11. A method for inputting alphanumeric characters as claimed in Claim 9,
wherein, in response to the input of a first letter, the input of a second letter requires
that a key associated with the second letter be pressed only once.

12. A method for inputting alphanumeric characters as claimed in Claim 9, wherein symbols may be input as well as alphanumeric characters, such that, in response to the input of a first symbol, the input of a second symbol requires that a key
5 associated with the second symbol be pressed only once.

13. An apparatus for inputting alphanumeric characters, comprising:
at least one key associated with a plurality of alphanumeric characters;
a memory device for flexibly storing information relating to an association
10 between inputtable characters and a number of keystrokes required for inputting the characters;
a display device for displaying a preselection window which is used to select a character to be input; and
a processor device which is set up such that, when a string of characters is
15 input, the association, used for inputting a further character, between the inputtable characters and the number of keystrokes required for inputting the characters, can be automatically matched to a user's behavior in response to a character which has been input, the matching to the user's behavior being structured such that the number of
20 keystrokes is reduced as compared with a fixed association between the inputtable characters and the number of keystrokes required for inputting the characters, and the preselection windows showing the characters which can be input using a key in an order which corresponds to a current association between characters and the number of keystrokes which are required for inputting the characters, with a currently selected character being shown in highlight.

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14. An apparatus for inputting alphanumeric characters as claimed in Claim 13, wherein the processor device is further set up such that, in response to the input of a first digit, the input of a second digit requires that a key associated with the second digit be pressed only once.

30

15. An apparatus for inputting alphanumeric characters as claimed in Claim 13, wherein the processor device is further set up such that, in response to the input of

a first letter, the input of a second letter requires that a key associated with the second letter be pressed only once.

16. An apparatus for inputting alphanumeric characters as claimed in Claim 13, wherein the processor device is further set up such that symbols can be input as well as alphanumeric characters and, in response to the input of a first symbol, the input of a second symbol requires that a key associated with the second symbol be pressed only once.

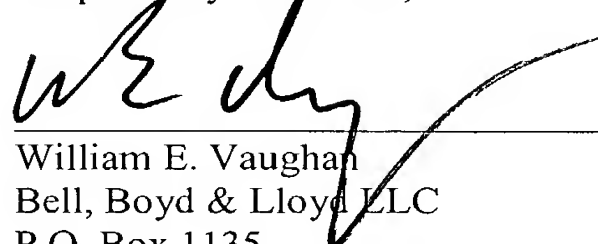
REMARKS

The present amendment makes editorial changes and corrects typographical errors in the specification, which includes the Abstract, in order to conform the specification to the requirements of United States Patent Practice. No new matter is added thereby. Attached hereto is a marked-up version of the changes made to the specification by the present amendment. The attached page is captioned "**Version With Markings To Show Changes Made**".

In addition, the present amendment cancels original claims 1-8 in favor of new claims 9-16. Claims 9-16 have been presented solely because the revisions by red-lining and underlining which would have been necessary in claims 1-8 in order to present those claims in accordance with preferred United States Patent Practice would have been too extensive, and thus would have been too burdensome. The present amendment is intended for clarification purposes only and not for substantial reasons related to patentability pursuant to 35 U.S.C. §§101, 102, 103 or 112. Indeed, the cancellation of claims 1-8 does not constitute an intent on the part of the Applicants to surrender any of the subject matter of claims 1-8.

Early consideration on the merits is respectfully requested.

Respectfully submitted,



(Reg. No. 39,056)

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Attorneys for Applicants

processor device PE or even outside the appliance containing the processor device PE and is connected to the processor device PE ~~by means of~~ via lines or a bus system.

Figure 1 shows the association between inputtable characters *zei* and the number of keystrokes respectively required therefor in the memory device SPE, using the key *tas* labeled “2”. Thus, by way of example, when starting to input a message or after a letter has been input, or in response to the input of a letter, one keystroke is required in order to input the letter “A”, two keystrokes are required in order to input the letter “B”, three keystrokes are required in order to input the letter “C” and four keystrokes are required in order to input the digit “2”.

After a digit has been input, or in response to the input of a digit, the association between characters which can be input using the keys and the number of keystrokes required for inputting these characters is matched to the user’s behavior, and hence different numbers *anz’* are assigned to the inputtable characters *zei*. Accordingly, the input of a further digit requires only one keystroke on the key associated with this digit. In the example shown here, the input of a “2” requires only one keystroke, whereas the input of a letter “A” to “C” now requires one respective keystroke more as compared with the original number *anz*. Appropriate matching of the association between characters *zei* and the number of keystrokes required for inputting them is also carried out automatically for the other keys, so that, by way of example, the input of a “3” after a “2” has been input also requires only one keystroke.

Depending on the ~~variant~~ embodiment, a space character can indicate the end of a string of digits and the start of a string of letters or the continuation of a started string of digits or a started string of letters.

One ~~refinement~~ embodiment of the present invention provides for a key *tas* to have an associated symbol *sym* as well as associated letters and an associated digit *zif*. When a string of symbols is input, the association between characters which can be input using a key and the number of keystrokes required for inputting these characters is adjusted in line with the matching described above for the input of a string of digits.

Figure 2 shows a control device and, below that, a sketch of the associated memory use in two different input modes; once after a letter has been input MMI and once after a digit has been input MMI’.

In this case, the keypad device corresponds to the keypad device TAS described in fFigure 1. The lower region of the display DPL contains a preselection window VF which shows the characters which can be input using a key in an order which reflects the number of keystrokes which is required for inputting the individual characters.

A provision in another ~~refinement~~ embodiment of the present invention is that, although the characters in this preselection window are shown in a fixed order, a marker (cursor) automatically marks the character whose input requires only one keystroke.

In ~~one variant~~ a further embodiment of the present invention, the currently selected character, which is deemed to have been input after a certain time period has elapsed, is in first position in this case. The upper region of the display DPL shows the characters which have been input so far, and a second preselection window VF shows the character which is currently to be input in highlight. In this case, the upper preselection window contains the character which is in first position in the lower preselection window.

The memory use shown partially for the keys labeled "2" and "3" shows the known association between characters zei which can be input using a key and the number anz of keystrokes respectively required therefor.

The second illustration of the control device MMI' shows the display DPL after a digit has been input. This illustration's preselection window VF, which appears after the key labeled "3", for example, has been pressed once, shows the characters which can be input using this key and are again arranged in an order which reflects the number of keystrokes which is required for inputting the individual characters. It can be seen that, in response to the input of a digit "4", the association between characters which can be input using this key and the number of keystrokes required therefor has been matched to the user's behavior such that the first position now contains the digit "3", ~~which means that~~ wherein only one keystroke is required in order to input this digit "3".

The memory use shown partially for the keys labeled "2" and "3" shows the association, automatically matched to the user's behavior, between characters zei

which can be input using a key and the number anz' of keystrokes respectively required therefor after a digit has been input.

Depending on the ~~variant~~ particular embodiment of the present invention, the order of the characters can, for the purposes of matching to the user's behavior, be produced cyclically or in line with statistical examinations relating to the probability of occurrence of a specific string of characters.

~~One variant~~ In addition, one embodiment of the present invention provides for the input mode change, effected by inputting a digit or a letter, or the current input mode to be displayed using a visual signal, such as an appropriate symbol on the display DPL.

Although the present invention has been described with reference to specific embodiments, those of skill in the art will recognize that changes may be made thereto without departing from the spirit and scope of the invention as set forth in the hereafter appended claims.

17

GR 99 P 2771

2/ppts

Description

Method and arrangement for inputting alphanumeric characters

5

The invention relates to a method and an arrangement for inputting alphanumeric characters, where the keys used for input have multiple associations, i.e. with a multiplicity of characters.

10

The rapid spread of mobile radio telephones has just recently been accompanied by similarly rapid development of mobile data transmission, in particular in the form of "short messages" transmitted using a "Short Message Service" (SMS). In this context, text information is input into mobile radio telephones usually using a keypad device which contains twelve keys, where the individual keys for inputting the letters, digits and special characters have multiple associations. Depending on the character which is to be input, the key associated with this character needs to be pressed in accordance with a number of keystrokes which is required for inputting this character and has a fixed association with the character. Thus, by way of example, the key labeled "2" needs to be pressed once to input the letter "A", needs to be pressed twice to input the letter "B", needs to be pressed three times to input the letter "C" and needs to be pressed four times to input the digit "2". This has the advantage that a practiced user can input texts quickly. A drawback of such an implementation, however, is that the maximum number of keystrokes is generally required in order to input strings of digits, such as telephone numbers. Thus, inputting the number "222" generally requires that the key labeled with the digit "2" be pressed twelve times.

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The invention is therefore based on the problem of specifying methods and arrangements which allow alphanumeric

characters to be input intuitively and with little effort using keys which have multiple associations.

5 The invention achieves this object by means of the features of the independent patent claims. Advantageous and expedient developments can be found in the dependent claims.

10 The invention is thus based on the concept of the input of strings of characters involving the association between inputtable characters and the number of keystrokes required for inputting a character being matched to the user's behavior on the basis of characters which have already been input.

15 The matching can be done, by way of example, such that the keystrokes required for inputting a string of characters is reduced as compared with a fixed association between inputtable characters and the appropriate number of keystrokes required for inputting these characters.

25 Particularly when the matching to the user's behavior is structured such that, in automatic response to the input of a first digit, the input of a second digit requires that the key associated with the second digit be pressed only once, the input of a string of digits, for example a telephone number, requires a much smaller number of total keystrokes than would be the case if there were a fixed association between characters and the number of keystrokes required therefor in each case.

35 In the context of the present invention, key is understood to mean any type of operating elements, which may also be produced by a membrane keypad or a touch screen.

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Advantageous and expedient developments can be found in the dependent claims.

The object is also achieved by specifying an arrangement for inputting alphanumeric characters. This arrangement is particularly suitable for carrying out the inventive method or one of its developments.

5

The invention is described in more detail below using preferred exemplary embodiments which are explained with reference to the figures listed below:

10 Figure 1 schematic illustration of a variant embodiment of an inventive arrangement;

Figure 2 a sketch which shows a control device in various stages of a variant embodiment of an inventive method.

15

Figure 1 shows a control device MMI comprising a display device, such as a graphical display DPL, and a keypad device TAS having various keys tas. In this case, the keys tas have multiple associations for inputting a plurality of characters. Thus, by way of example, the key labeled "2" has the associated characters "2", "A", "B" and "C". It is thus possible to use this key to input both a digit zif and letters bs. One variant embodiment of the invention provides for at least one key also to have an associated symbol sym, as is shown by means of the key labeled "3".

20

25

To control this control device MMI, a processor device PE, such as a microcontroller, is provided which comprises a processor CPU, a memory device SPE and an input/output interface which can be used to produce the connection to the control device MMI. The elements of the processor device are connected to one another via a bus system BUS.

30

35

user's behavior, and hence different numbers anz' are assigned to the inputtable characters zei. Accordingly, the input of a further digit requires only one keystroke on the key associated with this digit. In the
 5 example shown here, the input of a "2" requires only one keystroke, whereas the input of a letter "A" to "C" now requires one respective keystroke more as compared with the original number anz. Appropriate matching of the association between characters zei and the number
 10 of keystrokes required for inputting them is also carried out automatically for the other keys, so that, by way of example, the input of a "3" after a "2" has been input also requires only one keystroke.

15 Depending on the variant embodiment, a space character can indicate the end of a string of digits and the start of a string of letters or the continuation of a started string of digits or a started string of letters.

20 One refinement of the invention provides for a key tas to have an associated symbol sym as well as associated letters and an associated digit zif. When a string of symbols is input, the association between characters
 25 which can be input using a key and the number of keystrokes required for inputting these characters is adjusted in line with the matching described above for the input of a string of digits.

30 Figure 2 shows a control device and, below that, a sketch of the associated memory use in two different input modes, once after a letter has been input MMI and once after a digit has been input MMI'.

35 In this case, the keypad device corresponds to the keypad device TAS described in figure 1. The lower region of the display DPL contains a preselection

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window VF which shows the characters which can be input using a key in an order

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which reflects the number of keystrokes which is required for inputting the individual characters.

A provision in another refinement of the invention is that, although the characters in this preselection window are shown in a fixed order, a marker (cursor) automatically marks the character whose input requires only one keystroke.

10 In one variant embodiment of the invention, the currently selected character, which is deemed to have been input after a certain time period has elapsed, is in first position in this case. The upper region of the display DPL shows the characters which have been input
15 so far, and a second preselection window VF shows the character which is currently to be input in highlight. In this case, the upper preselection window contains the character which is in first position in the lower preselection window.

20 The memory use shown partially for the keys labeled "2" and "3" shows the known association between characters zei which can be input using a key and the number anz of keystrokes respectively required therefor.

25 The second illustration of the control device MMI' shows the display DPL after a digit has been input. This illustration's preselection window VF, which appears after the key labeled "3", for example, has
30 been pressed once, shows the characters which can be input using this key and are again arranged in an order which reflects the number of keystrokes which is required for inputting the individual characters. It can be seen that, in response to the input of a digit
35 "4", the association between characters which can be input using this key and the number of keystrokes required therefor has been matched to the user's

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behavior such that the first position now contains the digit "3", which means that only one keystroke is required in order to input this digit "3".

The memory use shown partially for the keys labeled "2" and "3" shows the association, automatically matched to the user's behavior, between characters *zei* which can be input using a key and the number *anz'* of keystrokes
 5 respectively required therefor after a digit has been input.

Depending on the variant embodiment of the invention, the order of the characters can, for the purposes of
 10 matching to the user's behavior, be produced cyclically or in line with statistical examinations relating to the probability of occurrence of specific string of characters.

15 One variant embodiment of the invention provides for the input mode change, effected by inputting a digit or a letter, or the current input mode to be displayed using a visual signal, such as an appropriate symbol on the display DPL.

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Patent Claims

1. A method for inputting alphanumeric characters, in which

- 5 - at least one key (tas) has an associated multiplicity of characters,
- this multiplicity of characters (zei) contains at least one digit (zif) and at least one letter (bs),
- a particular character from this multiplicity can
10 be input using a particular number of keystrokes which is associated with this character,
- when a string of characters is input, the association, used for inputting a further character, between inputtable characters (zei) and the number
15 (anz) of keystrokes required for inputting these characters can be automatically matched to the user's behavior in response to a character which has been input,
- the matching to the user's behavior is structured
20 such that the number of keystrokes is reduced as compared with a fixed association between inputtable characters and the number of keystrokes required for inputting these characters,
- a character to be input is selected using at least
25 one preselection window, and
- the preselection window shows the characters which can be input using a key in an order which corresponds to the current association between characters and a number of keystrokes which are required for inputting
30 these characters, with the currently selected character being shown in highlight.

2. The method as claimed in claim 2, in which, in response to the input of a first digit, the input of a
35 second digit requires that the key associated with the second digit be pressed only once.

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3. The method as claimed in one of the preceding claims, in which, in response to the input of a first letter, the input of a second letter requires that the

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which can be input using a key in an order which corresponds to the current association between characters and the number of keystrokes which are required for inputting these

characters, with the currently selected character being shown in highlight.

6. The arrangement as claimed in claim 5, having

5 - a processor device (PE) which is set up such that,
in response to the input of a first digit, the input of
a second digit requires that the key associated with
the second digit be pressed only once.

10 7. The arrangement as claimed in one of claims 5 to
6, having

- a processor device (PE) which is set up such that, in response to the input of a first letter, the input of a second letter requires that the key associated with the second letter be pressed only once.

8. The arrangement as claimed in one of claims 5 to 7, having

20 - a processor device (PE) which is set up such that symbols can also be input as well as alphanumeric characters, and, in response to the input of a first symbol, the input of a second symbol requires that the key associated with the second symbol be pressed only once.

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Abstract

Method and arrangement for inputting alphanumeric characters

For inputting alphanumeric characters using keys which have multiple associations, when a string of characters is input, the association between inputtable characters and the number of keystrokes required for inputting these characters is automatically matched to the user's behavior.

Figure 1

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FIG 1

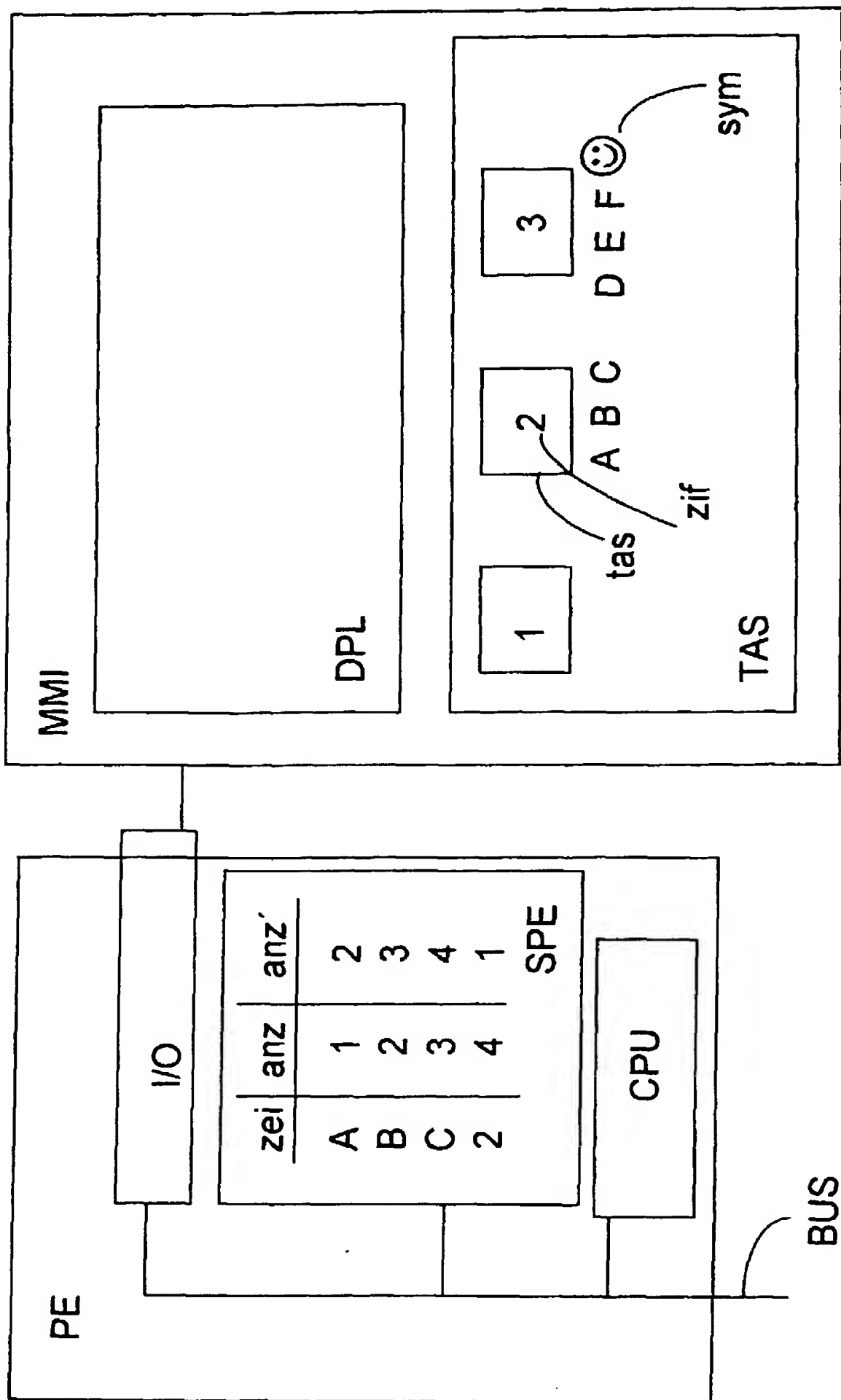
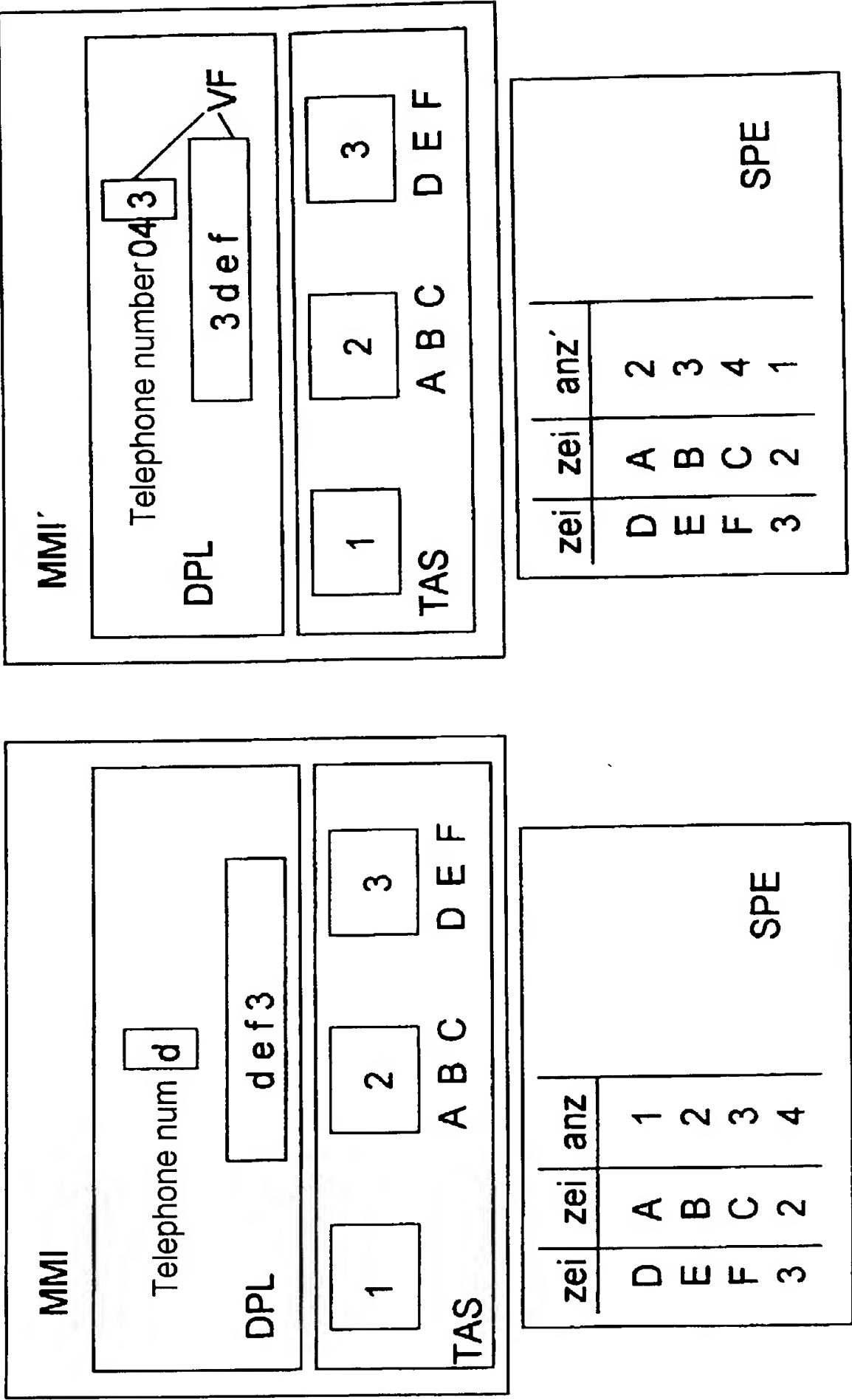


FIG 2

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Declaration and Power of Attorney For Patent Application

Erklärung Für Patentanmeldungen Mit Vollmacht

German Language Declaration

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Verfahren und Anordnung zur Eingabe alphanumerischer Zeichen

deren Beschreibung

(zutreffendes ankreuzen)

☐ hier beigefügt ist.

☒ am 19.04.2000 als

PCT internationale Anmeldung

PCT Anmeldungsnummer PCT/DE00/01168

eingereicht wurde und am

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As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

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Method and apparatus for inputting alphanumeric characters

the specification of which

(check one)

☐ is attached hereto.

☒ was filed on 19.04.2000 as

PCT international application

PCT Application No. PCT/DE00/01168

and was amended on (if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims as amended by any amendment referred to above

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

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Prior foreign applications
Priorität beansprucht

Priority Claimed

19942946.4

DE

08.09.1999



(Number)

(Country)

(Day Month Year Filed)

Yes

No

(Nummer)

(Land)

(Tag Monat Jahr eingereicht)

Ja

Nein

(Number)

(Country)

(Day Month Year Filed)



(Nummer)

(Land)

(Tag Monat Jahr eingereicht)

Yes

No

Ja

Nein

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(Day Month Year Filed)



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(Application Serial No.)
(Anmeldeseriennummer)

19.04.2000

(Filing Date D, M, Y)
(Anmeldedatum T, M, J)

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(patentiert, anhängig,
aufgegeben)

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(Status)
(patented, pending,
abandoned)

(Application Serial No.)
(Anmeldeseriennummer)

(Filing Date D,M,Y)
(Anmeldedatum T, M; J)

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Unterschrift des Erfinders		Second Inventor's signature	
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